Elevation Derivatives for National Applications

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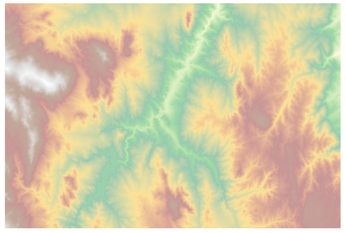
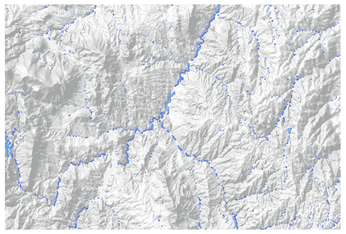


Filled DEM

File Type: Grid-Integer
Valid Values: Elevation

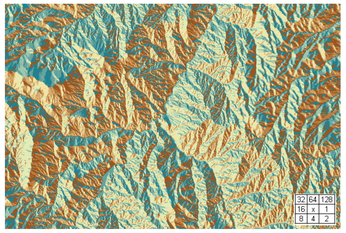
To create this grid, an algorithm is used to locate and fill all depressions or sinks where there is no flow from pixel to pixel within a hydrologic unit. During this processing step, efforts were made to maintain natural sink features.



Sinks

File Type: Vector (polygon)

Defines the extent of each depression filled during creation of the filled digital elevation model. Each cell within a depression is assigned a unique value. Upland cells are assigned a value of "no data." The sinks are polygons representing filled areas in the digital elevation model that are larger than 1000 contiguous pixels or more.



Flow Direction

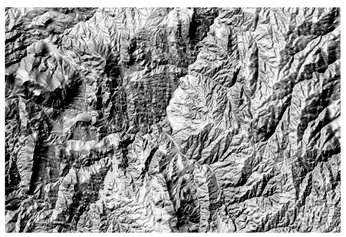
File Type: Grid -Integer

This grid describes the direction of flow from each pixel to its steepest down slope neighbor. In the case of a maintained depression, flow directions are referred to as undefined. If a cell has the same change in elevation values in multiple directions, and is part of a sink, the flow direction value for that cell is coded as the sum of those directions. Generated from the filled DEM using the 'flowdirection' function. Each cell is assigned a code (value) that defines the direction water will flow from the cell. There are eight possible flow directions: east (1), southeast (2), south (4), southwest (8), west (16), northwest (32) north (64), and northeast (128).

Flow Accumulation

File Type: Grid Floating Point

Represents the number of upstream cells that flow to a specific cell. Each cell is assigned a value that is the sum of all the cells that contribute flow to the cell. Generated from the flow direction grid using the 'flowaccumulation' function. Threshold values are closely related to network density. The higher the threshold value, the lower the network density and the lower the threshold value, the higher the network density. In this project the threshold value for flow accumulation required to begin a synthetic streamline was set to 5000 cells.



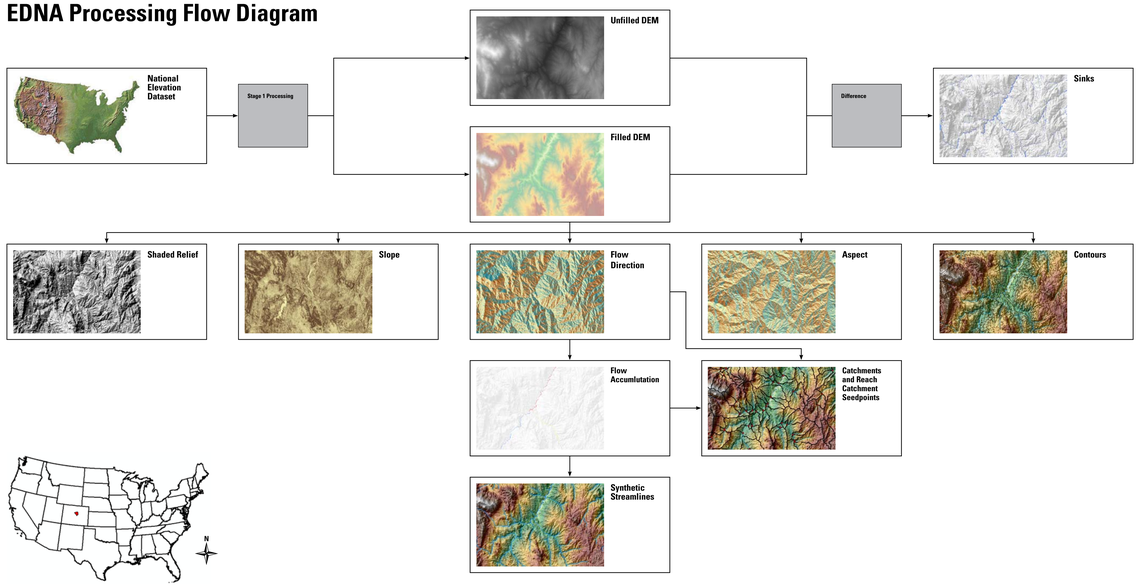
Shaded Relief

File Type: Grid -Integer
Valid Values: 0-254

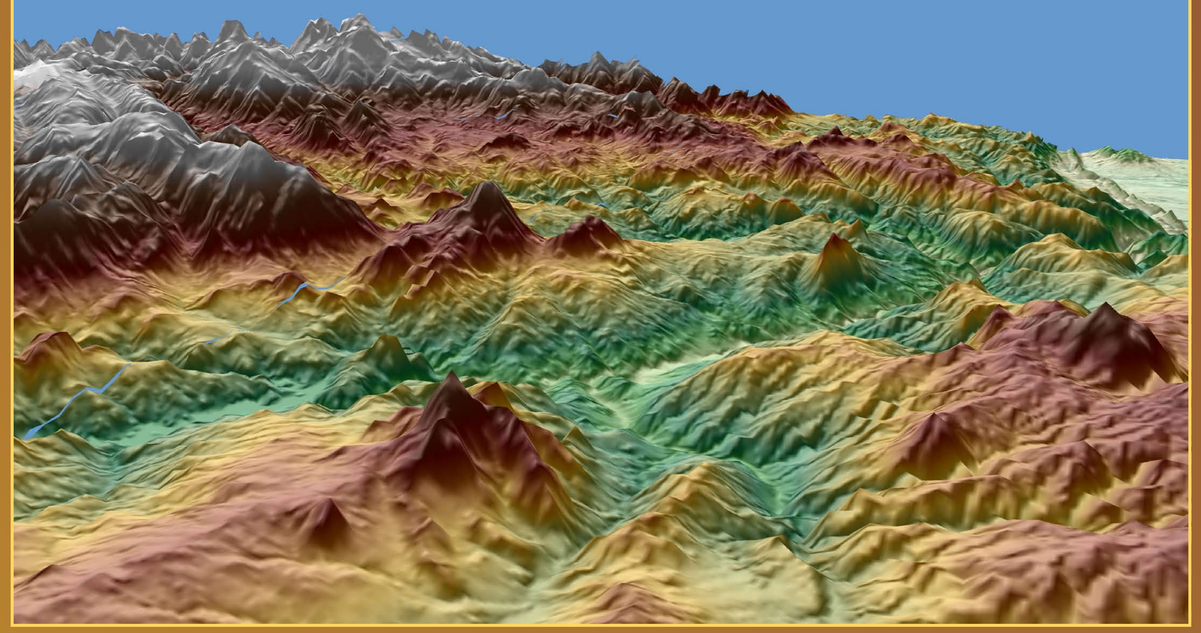
Created from the original digital elevation model grid using the "hillshade" function.

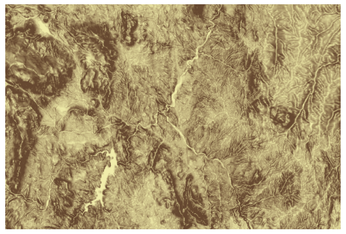
Parameters:
Sun azimuth = 315 degrees
Sun elevation = 60 degrees
Vertical exaggeration factor of 5x

EDNA Processing Flow Diagram



EDNA is a multi-layered database derived from a version of the National Elevation Dataset, which has been hydrologically conditioned for improved hydrologic flow representation. The seamless EDNA database provides 30-meter resolution raster and vector data layers.

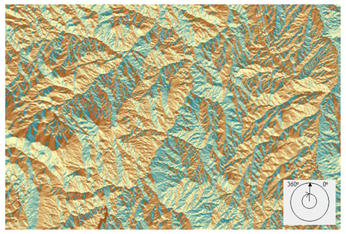




Slope

File Type: Grid
Valid Values: 0 to 90 degrees

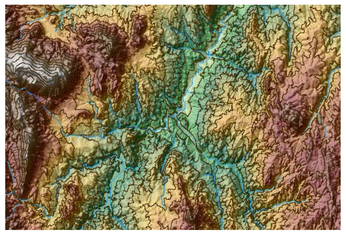
Generated from the filled digital elevation model using the 'slope' function.



Aspect

File Type: Grid Integer
Valid Values:

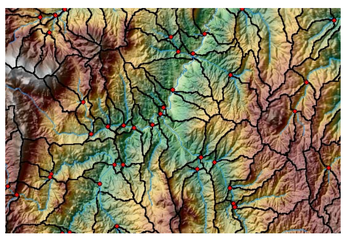
Downslope direction of maximum rate of change from one pixel to its neighbors. Non-defined aspect (slope = 0) are assigned a value of -99. Aspect values (from -1 to 360 degrees in floating point format) were multiplied by 100 to convert to integers and retain 2 decimal places of precision.



Contours

File Type: Vector (polyline)

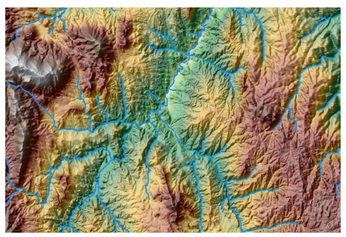
Topographic isolines derived from the EDNA original digital elevation model. Contour intervals are variable depending on regional topography. The contour interval is typically 100 meters. If the range of elevation values in a local area was less than 100 meters, then a contour interval of 10 meters was used. If the range of elevation values in a local area was less than 10 meters, then a contour interval of 1 meter was used.



Reach Catchments and Seedpoints

File Type: Vector (polygon)

The catchment basin defines the area of all basins corresponding to a predefined set of seed points. At each confluence, a catchment basin is determined for each synthetic stream line forming the confluence. The area of each catchment basin is equal to the total upstream area minus the area of any upstream catchment basins. Each catchment basin is assigned a unique value and all of the cells in the basin carry that value. Catchments are derived by creating watersheds using the confluence points of synthetic streamlines as seed points. A typical catchment covers approximately 2 square miles. Each catchment is also assigned a Pfafstetter number that identifies the basin subdivision level, relates associated seed points and streamlines, and allows for analysis of upstream and downstream flow relationships with any other catchment or stream.



Synthetic Streamlines

File Type: Vector (polyline)

This coverage is derived from the flow accumulation grid. A threshold of 5,000 cells is applied to the flow accumulation grid, and a mask is created. Cells having a value greater than 5,000 are set to 1, and the remaining cells are set to "NODATA". The mask grid is then converted to the vector streamlines coverage. (also referred to as "synthetic streamlines"). Each synthetic streamline is also assigned a Pfafstetter number that identifies the basin subdivision level, relates associated seed points and catchments, and allows for analysis of upstream and downstream flow relationships with any other catchment or stream.

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